CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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THE APPRAISAL OF CONTENT IS TENTATIVE.
(FOR KEY SEE REVERSE)

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The 022 "A" (Turboprop)

1. The 022 "A" developed in its final form over 5,000 shaft hp for a specific fuel consumption of 210 to 230 g/b. hp/hr. 25X1
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Though reduction gear troubles had been experienced on the earlier examples of this engine, the 022 "A" in its final form was extremely reliable. As orginally designed, the reduction gear was heavy for this type of engine and the Soviets, who were not prepared to accept the weight penalties imposed, insisted that the gear box should be redesigned. In the second gear box design, largely attributed to Dr. Alfred Scheibe, the weight limits laid down by the Soviets were complied with, hence initial troubles with the gear box. Mainly because of Scheibe's technical ability, the 022 "A" after a few modifications to the gears was soon running perfectly and this engine is an invaluable contribution to the Soviet aircraft industry. 25X1 25X1

2. the 022 "A" is probably in series production and was not superseded by the "K" engine. 25X1 25X1
the engine has been extensively flight-tested. 25X1

3. As finally tested on the water brake and on the test stand, the 022 "A" had tinned brass blocks fitted inside the turbine casing to reduce turbine blade tip clearance.

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(Note: Washington Distribution Indicated By "X"; Field Distribution By "#".)

[redacted] it also added rigidity to the turbine housing and prevented distortion on cooling. [redacted] 25X1 25X1 25X1

The 022 "M" (Turboprop)

4. When the idea of coupling two 022 "A" engines to form the 022 "M" was first mooted, [redacted] 25X1 by 1952 the USSR designers had produced an air frame which called for two power units of 10,000 hp each and were demanding an engine so that flight tests could be carried out. [redacted] the aircraft was already in existence at that time which was ultimately to be powered by the "K". [redacted] the 022 "M" [redacted] was merely an expedient and its use was strictly limited. [redacted] there was no question of using one engine to achieve increased range and this was indeed impossible with the gearing developed at Kuybyshev under the guidance of Dr. Alfred Scheibe. 25X1 25X1 25X1 25X1 25X1

The "K" Engine (Turboprop)

5. The "K" engine had 14 compressor stages and five turbine stages, developing in its final form as tested at Kuybyshev 10,000 shaft hp for a specific fuel consumption of 235 g/b. hp/hr.

6. The "K" had the tinned brass blocks fitted inside turbine casing as was the case with the 022 "A". [redacted] the "K" these blocks reduced the specific fuel consumption by 15 g/b.hp/hr. The graphite blocks used experimentally inside the shroud rings of the 022"A" engine to reduce turbine blade tip clearance were never tried on the "K" since they had proved too sensitive to gas erosion despite initial tests indicating that graphite was a promising material. [redacted] 25X1 25X1 25X1 25X1 25X1 25X1

[redacted] it was quite possible that Soviet engineers were carrying on a parallel development of the "K" elsewhere and that another experimental station was, in fact, building "K" engines which had been flight tested. In Kuybyshev at least [redacted] the "K" engine had been subjected to water brake tests and to static tests only. Static testing was indeed almost completed, though the engine had not run at full power when German engineers were transferred to Ostashkov. 25X1 25X1

The "D Project"

7. [redacted] the "D Project" was a development of the "K" engine, differing from the "K" as follows: 25X1

a. A supersonic compressor which would probably have only nine stages in place of the 14 stages used on the "K" was static tested as a unit at Kuybyshev. This compressor was never tested as a unit at Kuybyshev though individual compressor stages were constructed and tested. All the supersonic compressor stages were of steel, unlike the initial compressor stages of the "K", which were of light alloy.

b. [redacted] 25X1

c. The temperature in the turbine of the "K" was 1200°K. which was to be raised to 1400°K. on the "D".

8. the "L Project" never progressed beyond the testing of individual compressor stages as already stated, though it was quite possible that work on an engine of this or similar specification was being carried out in a parallel experimental station in the USSR. 25X1 25X1

9. the 022 "A" never ran satisfactorily with any blades other than those of nickel steel alloys Turbine blades of sintered ceramic on a metal base manufactured elsewhere were sent to Kuybyshev for testing. A rotor assembly was built for the 022 "A" with one turbine stage of sintered blades. These proved too friable for normal use and were discarded. For these blades the normal fir tree root was used. They were dark grey in color. Such blades were never used even experimentally on the "K". The main difficulty is the cracking of the ceramic cover because of differences in thermal expansions, mainly during starting and stopping. 25X1 25X1

10. Nimonic 80 was used for turbine construction as well as a new metal, which had been subjected to a heat treatment which involved the use of boron. 25X1 25X1

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12. the 014 engine was a pointless (zwecklos) project as developed at Kimry-Savelovo. it had 12 compressor and three turbine stages, the compressor and rotor assemblies being mounted on a single shaft. It is a pure jet developing 3,000 kg. static thrust. The auxiliary equipment for the 014, including the gas turbo-starter, is the same as that of the 022 "A". 25X1 25X1

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